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Personal Attention**

Ms. Charlene Fitch
Missouri Department of Natural Resources
Division of Environmental Quality
1730 East Elm Street
Jefferson City, Missouri 65101

December 17, 2013

Dear Ms. Fitch:

**Assessment Monitoring Plan – Wells 104-SS and 104-SD
Bridgeton Landfill, LLC. Bridgeton Landfill
Bridgeton, Missouri
Missouri DNR Permit #MO - 118912**



On behalf of the Bridgeton Landfill, LLC Bridgeton Landfill, Herst & Associates, Inc. is submitting the enclosed Assessment Monitoring Plan (AMP) for the facility. This AMP has been prepared in response to confirmed inorganic constituent statistical exceedances and confirmed organic constituent detections observed at groundwater monitoring wells 104-SS and 104-SD during the November 2012 and April 2013 monitoring events. The AMP has been prepared in accordance with Title 10 of the Missouri Code of State Regulations (CSR) 80-3.010 (11)(C)6.C, and with the September 27, 2013 Missouri Department of Natural Resources (MDNR) comment letter regarding the November 2012 split-sampling performed by MDNR personnel.

Should you have any questions or concerns, please contact the undersigned at your earliest convenience.

Sincerely,

HERST & ASSOCIATES, INC.



Ward E. Herst
Managing Partner

Andrew Wyatt
Senior Environmental Scientist

cc: *Brian Power – Republic Services
Victorian Warren – Republic Services*

Attachments: Assessment Monitoring Plan – Wells 104-SS and 104-SD

Assessment Monitoring Plan Wells 104-SS and 104-SD

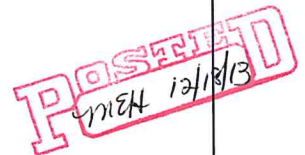
Bridgeton Landfill, LLC
Bridgeton Landfill
Bridgeton, Missouri

MDNR Permit #MO - 118912

December 2013



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TABLE OF CONTENTS

1.0	INTRODUCTION.....	1
2.0	SITE HYDROGEOLOGY	1
3.0	SUMMARY OF NOVEMBER 2012 AND APRIL 2013 EXCEEDANCES	1
4.0	MONITORING PLAN	2
4.1	Assessment Constituents	3
4.2	Groundwater Protection Standards.....	3
4.3	Pre-Assessment Conditions.....	3
4.3.1	Concentration of Assessment Constituents.....	3
4.3.2	Extent of Assessment Constituents	4
4.3.3	Migration Rate of Assessment Constituents.....	4
4.4	Proposed Assessment Monitoring Wells	4
4.5	Proposed Sampling Methods.....	4
4.6	Proposed Analytical Methods	5
4.7	Evaluation of Assessment Monitoring Data	5

LIST OF TABLES

4-1	Summary of Assessment Monitoring Program
4-2	Assessment Monitoring Constituents
4-3	Concentrations of Assessment Monitoring Constituents
4-4	Assessment Monitoring Wells
4-5	Recommended Laboratory Analytical Methods

LIST OF FIGURES

3-1	Well Location Map
4-1	Proposed Assessment Monitoring Wells

LIST OF APPENDICES

A	Extent of Assessment Constituents
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1.0 INTRODUCTION

On behalf of the Bridgeton Landfill, LLC – Bridgeton Landfill, Herst & Associates, Inc. has prepared this Assessment Monitoring Plan (AMP) for the facility. The AMP has been prepared in response to confirmed inorganic constituent statistical exceedances and confirmed organic constituent detections observed during the November 2012 and April 2013 monitoring events.

2.0 SITE HYDROGEOLOGY

Three hydrogeologic units are monitored as a part of the Bridgeton Landfill groundwater detection monitoring network. From shallowest to deepest, these units are: the Alluvium Unit, the St. Louis / Upper Salem Unit, and the Deep Salem Unit.

The Alluvium Unit consists of alluvium overlain by loess. The materials range from a silty clay / clayey silt to a sand. Groundwater elevations in the Alluvium Unit range from approximately 431 to 436 ft/msl. Groundwater monitoring wells screened in the Alluvium Unit are typically designated with the -AS suffix for a shallow alluvium well, -AI for an intermediate alluvium well, and -AD for a deep alluvium well.

The St. Louis / Upper Salem Unit consists of the St. Louis formation and the upper portions of the Salem formation. The St. Louis formation and Salem formation are both limestones. Although geologically distinct, they are considered a single hydrogeologic unit at the Bridgeton Landfill. Groundwater elevations in the St. Louis / Upper Salem Unit range from approximately 378 to 461 ft/msl. Monitoring wells screened in the St. Louis / Upper Salem Unit are typically designated with the –SS suffix.

The Deep Salem Unit consists of the lower portions of the Salem formation. Groundwater elevations in the Deep Salem Unit range from approximately 401 to 431 ft/msl. Monitoring wells screened in the Deep Salem Unit are typically designated with the –SD suffix.

Underlying the Salem formation are the limestone, siltstone and claystone Warsaw formation and the limestone Keokuk formation. The upper Keokuk formation comprises a fourth hydrogeologic unit at the site. However, Keokuk Unit wells, typically designated with the -KS suffix, are utilized for potentiometric surface monitoring only.

3.0 SUMMARY OF NOVEMBER 2012 AND APRIL 2013 EXCEEDANCES

As described in the February 20, 2013 *Groundwater Statistical Analysis Semi-Annual Report*, Deep Salem Unit well 104-SD exhibited confirmed statistical exceedances for the following inorganic constituents during the November 2012 groundwater monitoring event: ammonia, total barium, chemical oxygen demand (COD), chloride, total iron, total sodium, total dissolved solids (TDS), and total organic carbon (TOC). Of these, total barium, COD, chloride, total sodium, and TOC exhibited increasing statistical trends during the November 2012 event.

In accordance with MDNR correspondence dated October 23, 2003, a groundwater demonstration report or AMP may not be required for a well that exhibits a confirmed exceedance and upward trend for an inorganic constituent, unless the well also exhibits a

confirmed organic constituent detection above the laboratory reporting limit (RL). During the November 2012 event, 104-SD exhibited confirmed detections for benzene and toluene.

Accordingly, the February 20, 2013 Report recommended that the facility prepare an AMP in response to the confirmed inorganic exceedances and confirmed organic detections at 104-SD. As specified in an April 1, 2013 email from Ms. Connie Rozycki with the Missouri Department of Natural Resources (MDNR), the due date for submittal of the AMP is 90 days following receipt of the MDNR's comment letter on the November 2012 monitoring event. The MDNR's comment letter was received on September 27, 2013, indicating a due date of December 26, 2013 for the submittal of the AMP.

The April 2013 groundwater monitoring event was conducted at the Bridgeton Landfill while the MDNR's comment letter on the February 20, 2013 Report was under preparation. As described in the July 2, 2013 *Groundwater Statistical Analysis Semi-Annual Report*, the confirmed statistical exceedances and upward trends observed at 104-SD during the November 2012 event were repeated in April 2013. In addition, the well also exhibited new confirmed statistical exceedances for the following inorganic constituents: total arsenic, total boron, total hardness and total magnesium. Of these, only total magnesium exhibited an increasing statistical trend during the April 2013 event. 104-SD also exhibited confirmed detections for the following organic constituents during the April 2013 event: 1,2-dichloroethane, benzene, ethylbenzene, toluene, and total xylenes.

During the April 2013 monitoring event, adjacent St. Louis / Upper Salem Unit well 104-SS also exhibited confirmed detections for the following organic constituents: 1,2-dichloroethane, 1,4-dichlorobenzene, 4-methyl-2-pentanone, benzene, ethylbenzene, methyl ethyl ketone, toluene, and total xylenes. Well 104-SS has not exhibited confirmed statistical exceedances or upward trends for inorganic constituents.

In response to the results of the April 2013 monitoring event, the scope of this AMP was expanded to address inorganic exceedances and organic detections observed in both the November 2012 and April 2013 events. In accordance with Title 10 of the Missouri Code of State Regulations (CSR) 80-3.010 (11)(C)6.C, this AMP has been prepared in response to the confirmed inorganic statistical exceedances and confirmed organic detections at 104-SD in November 2012 and April 2013, and to the confirmed organic detections at 104-SS in April 2013. The locations of wells 104-SS and 104-SD are illustrated on **Figure 3-1**.

4.0 MONITORING PLAN

The proposed assessment monitoring program for the Bridgeton Landfill is summarized on **Table 4-1**. In accordance with 10 CSR 80-3.010(11)(C)6.C, the following components are included in this AMP:

- 1) The number, location, and depths of wells to be utilized in assessment monitoring;
- 2) The sampling and analytical methods to be utilized in assessment monitoring;
- 3) Procedures to be utilized to evaluate assessment monitoring data;
- 4) The approximate migration rate and extent of the assessment constituents; and
- 5) The approximate concentrations of the assessment constituents.

4.1 Assessment Constituents

The groundwater assessment constituents shall consist of:

- Constituents listed in 10 CSR 80-3 Appendix II that exhibited confirmed exceedances or detections at wells 104-SS and 104-SD in November 2012 and April 2013.
- Organic constituents detected in the 104-SS and 104-SD split samples collected by MDNR personnel in November 2012. These constituents are specified in the MDNR's September 27, 2013 comment letter on the monitoring event.

The assessment constituents are listed on **Table 4-2**. This list may be modified in future reports based on assessment monitoring results.

4.2 Groundwater Protection Standards

10 CSR 80-3.010(11)(C)6.E specifies that groundwater protection standards (GWPS) be established for assessment constituents:

- If the constituent's Maximum Contaminant Level (MCL) (National Primary Drinking Water Standard) is greater than its background concentration, the GWPS is equal to the MCL.
- If the constituent's background concentration is greater than its MCL, the GWPS is equal to the background concentration.
- If a MCL has not been established for the constituent, the GWPS is equal to the background concentration.

For inorganic constituents, the background concentration is the intra-well prediction limit based on data collected through the November 2011 monitoring event. (The November 2011 event is the last monitoring event prior to the initial, unconfirmed organic detections in May 2012.) For organic constituents, the background concentration is the laboratory RL.

The GWPS for each constituent at each well is listed on **Table 4-2**.

4.3 Pre-Assessment Conditions

4.3.1 Concentration of Assessment Constituents

The concentrations of assessment constituents observed in May 2012, November 2012, and April 2013 are summarized on **Table 4-3**. This table presents the concentrations observed at wells 104-SS, 104-SD, 105-SS, and 201A-SS. St. Louis / Upper Salem Unit Wells 105-SS and 201A-SS are the wells is closest proximity to the 104 well cluster that are also routinely sampled as a part of the facility's detection monitoring program.

4.3.2 Extent of Assessment Constituents

Maps illustrating the horizontal extent of the assessment constituents are presented in **Appendix A**. These maps were prepared based on data collected through April 2013, or through November 2012 in the case of constituents analyzed as a part of the MDNR split-sampling. Each map indicates the area where exceedances of the GWPSs have been observed. As of April 2013, exceedances of the GWPSs for routine Appendix I constituents have only been observed at wells 104-SS and 104-SD, and only for the following constituents: total arsenic, total cobalt, total nickel, total vanadium, 1,2-dichloroethane, 4-methyl-2-pentanone, acetone, benzene, methyl ethyl ketone, and toluene. During the November 2012 MDNR split-sampling, GWPS exceedances were observed for the following additional organic constituents at 104-SD: 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1-chlorobutane, isopropylbenzene, methyl tert-butyl ether, p-isopropyltoluene, and tetrahydrofuran.

4.3.3 Migration Rate of Assessment Constituents

As described above, exceedances of the GWPSs have to date only been observed at wells 104-SS and 104-SD. Because exceedances have only been observed at one well cluster, migration rates of the assessment constituents cannot be evaluated at this time.

The assessment monitoring will include monitoring of six investigative monitoring wells installed near 104-SS and 104-SD in October 2013 (209-SS, 209-SD, 210-SS, 210-SD, 211-SS, and 211-SD) in order to evaluate potential movement of assessment constituents along and away from the waste boundary. Migration rates will be assessed in future annual assessment monitoring reports, as described in **Section 4.7**.

4.4 Proposed Assessment Monitoring Wells

Nine groundwater monitoring wells will be sampled as a part of the assessment monitoring program: detection monitoring wells 104-SS and 104-SD; piezometer 104-KS; and investigative monitoring wells 209-SS, 209-SD, 210-SS, 210-SD, 211-SS, and 211-SD. The well locations are presented on **Figure 4-1**. The as-built specifications for the assessment monitoring wells, including well depths, are summarized on **Table 4-4**.

Well 104-KS will provide vertical characterization of groundwater within the Keokuk Unit at elevations below wells 104-SS and 104-SD and below the base of waste. Wells 210-SS, 210-SD, 211-SS, and 211-SD will provide horizontal characterization of groundwater to the northeast and southwest of 104-SS and 104-SD within the St. Louis / Upper Salem and Deep Salem Units, parallel to the waste boundary. Wells 209-SS and 209-SD will provide horizontal characterization of groundwater to the east of 104-SS and 104-SD within the St. Louis / Upper Salem and Deep Salem Units.

4.5 Proposed Sampling Methods

The proposed sampling method for each assessment well is listed on **Table 4-4**. The proposed sampling methods are consistent with those that have been utilized in past monitoring events.

4.6 Proposed Analytical Methods

As presented on **Table 4-1**, and in accordance with 10 CSR 80-3.010(11)(C)6.D, the assessment monitoring wells will be sampled for the constituents list in 10 CSR 80 Appendix II during the first assessment monitoring event. The first assessment monitoring event will be completed within 90 days of the Missouri Department of Natural Resources' (MDNR) approval of this AMP.

If an Appendix II constituent previously detected at 104-SS or 104-SD in November 2012 or April 2013 is detected at an assessment monitoring well during the first assessment monitoring event, that well will be monitored semi-annually for the detected constituents.

If an Appendix II constituent not previously detected at 104-SS or 104-SD in November 2012 or April 2013 is detected at an assessment monitoring well during the first assessment monitoring event, that well will be monitored quarterly for four consecutive quarters for the detected constituents.

The recommended analytical methods for the assessment monitoring constituents are summarized on **Table 4-5**.

4.7 Evaluation of Assessment Monitoring Data

In accordance with 10 CSR 80-3.010(11)(C)6.F, following each assessment monitoring event, an assessment monitoring event summary report will be submitted to the MDNR within 14 days of the receipt of laboratory analytical results. The summary report will list the concentrations of all assessment constituents detected in the assessment monitoring wells during the monitoring event.

In accordance with 10 CSR 80-3.010(11)(C)6.J, an annual assessment monitoring report will be submitted to the MDNR by August 31 of each year. The annual report will summarize the assessment monitoring results from the past year and compare the results to the GWPSs and background concentrations. The annual report will also re-evaluate the concentrations, extents, and migration rates of the assessment constituents, based on the past year's assessment monitoring results.

In accordance with 10 CSR 80-3.010(11)(C)6.G, if the annual report determines that concentrations of all assessment constituents are at or below background concentrations in the assessment monitoring wells for two consecutive semi-annual monitoring events, the facility may return wells 104-SS and 104-SD to detection monitoring.

In accordance with 10 CSR 80-3.010(11)(C)6.H, if the annual report determines that concentrations of any assessment constituents are above background concentrations but all concentrations are below GWPSs, the facility may continue with assessment monitoring or develop a corrective measures assessment (CMA), as determined to be appropriate by the MDNR.

In accordance with 10 CSR 80-3.010(11)(C)6.I, if the annual report determines that concentrations of any Appendix II constituents are above GWPSs in the assessment monitoring wells, the facility will develop a CMA and, if necessary, install additional monitoring

wells in order to further characterize the nature and extent of the impacts to groundwater in the vicinity of 104-SS and 104-SD. The facility will also continue with assessment monitoring.

Tables

Table 4-1
Assessment Monitoring Program
Bridgeton Landfill, LLC – Bridgeton, Missouri

First Assessment Monitoring Event									
Well	104-SS	104-SD	104-KS	209-SS	209-SD	210-SS	210-SD	211-SS	211-SD
Arsenic, Total	*	*	*	*	*	*	*	*	*
Barium, Total	*	*	*	*	*	*	*	*	*
Chromium, Total	*	*	*	*	*	*	*	*	*
Cobalt, Total	*	*	*	*	*	*	*	*	*
Nickel, Total	*	*	*	*	*	*	*	*	*
Vanadium, Total	*	*	*	*	*	*	*	*	*
1,2-Dichloroethane	*	*	*	*	*	*	*	*	*
1,2,4-Trimethylbenzene	*	*	*	*	*	*	*	*	*
1,3,5-Trimethylbenzene	*	*	*	*	*	*	*	*	*
1,4-Dichlorobenzene	*	*	*	*	*	*	*	*	*
1-Chlorobutane	*	*	*	*	*	*	*	*	*
4-Methyl-2-Pentanone	*	*	*	*	*	*	*	*	*
Acetone	*	*	*	*	*	*	*	*	*
Benzene	*	*	*	*	*	*	*	*	*
Ethylbenzene	*	*	*	*	*	*	*	*	*
Isopropylbenzene	*	*	*	*	*	*	*	*	*
Methyl Ethyl Ketone	*	*	*	*	*	*	*	*	*
Methyl tert-Butyl Ether	*	*	*	*	*	*	*	*	*
p-Isopropyltoluene	*	*	*	*	*	*	*	*	*
Tetrahydrofuran	*	*	*	*	*	*	*	*	*
Toluene	*	*	*	*	*	*	*	*	*
Xylenes, Total	*	*	*	*	*	*	*	*	*
All Other 10 CSR 80 Appendix II Constituents	*	*	*	*	*	*	*	*	*

Subsequent Assessment Monitoring Events									
Well	104-SS	104-SD	104-KS	209-SS	209-SD	210-SS	210-SD	211-SS	211-SD
Arsenic, Total	SA	SA	SA	SA	SA	SA	SA	SA	SA
Barium, Total	SA	SA	SA	SA	SA	SA	SA	SA	SA
Chromium, Total	SA	SA	SA	SA	SA	SA	SA	SA	SA
Cobalt, Total	SA	SA	SA	SA	SA	SA	SA	SA	SA
Nickel, Total	SA	SA	SA	SA	SA	SA	SA	SA	SA
Vanadium, Total	SA	SA	SA	SA	SA	SA	SA	SA	SA
1,2-Dichloroethane	SA	SA	SA	SA	SA	SA	SA	SA	SA
1,2,4-Trimethylbenzene	SA	SA	SA	SA	SA	SA	SA	SA	SA
1,3,5-Trimethylbenzene	SA	SA	SA	SA	SA	SA	SA	SA	SA
1,4-Dichlorobenzene	SA	SA	SA	SA	SA	SA	SA	SA	SA
1-Chlorobutane	SA	SA	SA	SA	SA	SA	SA	SA	SA
4-Methyl-2-Pentanone	SA	SA	SA	SA	SA	SA	SA	SA	SA
Acetone	SA	SA	SA	SA	SA	SA	SA	SA	SA
Benzene	SA	SA	SA	SA	SA	SA	SA	SA	SA
Ethylbenzene	SA	SA	SA	SA	SA	SA	SA	SA	SA
Isopropylbenzene	SA	SA	SA	SA	SA	SA	SA	SA	SA
Methyl Ethyl Ketone	SA	SA	SA	SA	SA	SA	SA	SA	SA
Methyl tert-Butyl Ether	SA	SA	SA	SA	SA	SA	SA	SA	SA
p-Isopropyltoluene	SA	SA	SA	SA	SA	SA	SA	SA	SA
Tetrahydrofuran	SA	SA	SA	SA	SA	SA	SA	SA	SA
Toluene	SA	SA	SA	SA	SA	SA	SA	SA	SA
Xylenes, Total	SA	SA	SA	SA	SA	SA	SA	SA	SA
All Other 10 CSR 80 Appendix II Constituents**	Q / SA	Q / SA	Q / SA	Q / SA	Q / SA	Q / SA	Q / SA	Q / SA	Q / SA

Notes

SA: Constituent to be analyzed semi-annually.

Q / SA: Constituent to be analyzed quarterly for four consecutive quarters and thereafter semi-annually.

** 10 CSR 80 Appendix II constituents detected during the first assessment monitoring event will be analyzed during subsequent assessment monitoring events.

Table 4-2
Assessment Monitoring Constituents
Bridgeton Landfill, LLC – Bridgeton, Missouri

Constituent	MCL	Background Concentration				GWPS			
		104-SS	104-SD	105-SS	201A-SS	104-SS	104-SD	105-SS	201A-SS
Inorganic Constituents (mg/L)									
Arsenic, Total	0.01	0.011	0.005	0.003	0.0065	0.011	0.01	0.01	0.01
Barium, Total	2	0.1107	0.218	0.1658	0.1473	2	2	2	2
Chromium, Total	0.1	0.0066	0.006	0.0064	0.00594	0.1	0.1	0.1	0.1
Cobalt, Total	NE	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Nickel, Total	NE	0.023	0.02	0.02	0.02	0.023	0.02	0.02	0.02
Vanadium, Total	NE	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Organic Constituents (ug/L)									
1,2-Dichloroethane	5	5	5	5	5	5	5	5	5
1,2,4-Trimethylbenzene	NE	*	*	*	*	RL	RL	RL	RL
1,3,5-Trimethylbeznene	NE	*	*	*	*	RL	RL	RL	RL
1,4-Dichlorobenzene	75	5	5	5	5	75	75	75	75
1-Chlorobutane	NE	*	*	*	*	RL	RL	RL	RL
4-Methyl-2-Pentanone	NE	10	10	10	10	10	10	10	10
Acetone	NE	10	10	10	10	10	10	10	10
Benzene	5	5	5	5	5	5	5	5	5
Ethylbenzene	700	5	5	5	5	700	700	700	700
Isopropylbenzene	NE	*	*	*	*	RL	RL	RL	RL
Methyl Ethyl Ketone	NE	10	10	10	10	10	10	10	10
Methyl tert-Butyl Ether	NE	*	*	*	*	RL	RL	RL	RL
p-Isopropyltoluene	NE	*	*	*	*	RL	RL	RL	RL
Tetrahydrofuran	NE	*	*	*	*	RL	RL	RL	RL
Toluene	1,000	5	5	5	5	1,000	1,000	1,000	1,000
Xylenes, Total	10,000	5	5	5	5	10,000	10,000	10,000	10,000

Notes

MCL: Maximum Contaminant Level (National Primary Drinking Water Standard)

NE: MCL not established.

For inorganic constituents, background concentration is intra-well prediction limit based on data collected through November 2011.

For organic constituents, background concentration is the laboratory reporting limit.

GWPS: Groundwater protection standard.

* Constituent not analyzed as a part of routine semi-annual detection monitoring. Addition of constituent to assessment monitoring list requested by MDNR. GWPS is laboratory reporting limit.

RL: Laboratory reporting limit.

Table 4-3
Concentrations of Assessment Constituents
Bridgeton Landfill, LLC – Bridgeton, Missouri

Constituent	104-SS				104-SD			
	GWPS	5/11/2012	11/27/2012	4/11/2013	GWPS	5/11/2012	11/27/2012	4/11/2013
Inorganic Constituents								
Arsenic, Total	0.011	<0.0050	<0.0050	<0.0050 / <0.0050	0.011	<5.0	0.0061 / 0.0060	0.027
Barium, Total	2	0.091	0.11	0.1 / 0.1	2	0.34	0.48 / 0.41	2
Chromium, Total	0.1	<0.0050	<0.0050	<0.0050 / <0.0050	0.1	0.0064	<0.0050 / <0.0050	0.0078
Cobalt, Total	0.005	<0.0050	<0.0050	<0.0050 / <0.0050	0.005	<0.0050	<0.0050 / <0.0050	0.0086
Nickel, Total	0.023	<0.01	<0.01	<0.01 / <0.01	0.023	0.013	0.011 / 0.01	0.06
Vanadium, Total	0.01	<0.01	<0.01	<0.01 / <0.01	0.01	<0.01	<0.01 / <0.01	0.038
Organic Constituents								
1,2-Dichloroethane	5	<5.0	20	43 / 41	5	<5.0	6.7 / 6.4	24
1,2,4-Trimethylbenzene*	RL	NA	NA	NA	RL	NA	6.56	NA
1,3,5-Trimethylbenzene*	RL	NA	NA	NA	RL	NA	1.38	NA
1,4-Dichlorobenzene	75	<5.0	8.2	6.3 / 6.8	75	<5.0	6.0 / 6.2	<5.0
1-Chlorobutane*	RL	NA	NA	NA	RL	NA	3.44	NA
4-Methyl-2-Pentanone	10	<10	63	220 / 210	10	<10	<10 / <10	<10
Acetone	10	<10	<10	<10 / <10	10	<10	<10 / <10	59
Benzene	5	<5.0	1,100	2,400 / 2,500	5	57	350 / 330	1,000
Ethylbenzene	700	<5.0	18	26 / 27	700	<5.0	11 / 11	24
Isopropylbenzene*	RL	NA	NA	NA	RL	NA	1.36	NA
Methyl Ethyl Ketone	10	<10	<10	110 / 98	10	<10	<10 / <10	37
Methyl tert-Butyl Ether*	RL	NA	NA	NA	RL	NA	4.40	NA
p-Isopropyltoluene*	RL	NA	NA	NA	RL	NA	12.20	NA
Tetrahydrofuran*	RL	NA	NA	NA	RL	NA	617	NA
Toluene	1,000	<5.0	78	140 / 140	1,000	4.4	140 / 130	1,800
Xylenes, Total	10,000	<5.0	48	66 / 69	10,000	<5.0	31 / 32	58

Constituent	105-SS				201A-SS			
	GWPS	5/11/2012	11/27/2012	4/4/2013	GWPS	5/11/2012	11/28/2012	4/8/2013
Inorganic Constituents								
Arsenic, Total	0.011	<0.0050	<0.0050	<0.0050	0.011	<0.0050	<0.0050	<0.0050
Barium, Total	2	0.17	0.18	0.17	2	0.11	0.13	0.13
Chromium, Total	0.1	<0.0050	<0.0050	<0.0050	0.1	<0.0050	<0.0050	0.0075
Cobalt, Total	0.005	<0.0050	<0.0050	<0.0050	0.005	<0.0050	<0.0050	<0.0050
Nickel, Total	0.023	<0.01	<0.01	<0.01	0.023	<0.01	<0.01	<0.01
Vanadium, Total	0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01
Organic Constituents								
1,2-Dichloroethane	5	<5.0	<5.0	<5.0	5	<5.0	<5.0	<5.0
1,2,4-Trimethylbenzene*	RL	NA	<0.5	NA	RL	NA	NA	NA
1,3,5-Trimethylbenzene*	RL	NA	<0.5	NA	RL	NA	NA	NA
1,4-Dichlorobenzene	75	<5.0	<5.0	<5.0	75	<5.0	<5.0	<5.0
1-Chlorobutane*	RL	NA	<0.5	NA	RL	NA	NA	NA
4-Methyl-2-Pentanone	10	<10	<10	<10	10	<10	<10	<10
Acetone	10	<10	<10	<10	10	<10	<10	<10
Benzene	5	<5.0	<5.0	<5.0	5	<5.0	<5.0	<5.0
Ethylbenzene	700	<5.0	<5.0	<5.0	700	<5.0	<5.0	<5.0
Isopropylbenzene*	RL	NA	<0.5	NA	RL	NA	NA	NA
Methyl Ethyl Ketone	10	<10	<10	<10	10	<10	<10	<10
Methyl tert-Butyl Ether*	RL	NA	<0.5	NA	RL	NA	NA	NA
p-Isopropyltoluene*	RL	NA	<0.5	NA	RL	NA	NA	NA
Tetrahydrofuran*	RL	NA	<2.5	NA	RL	NA	NA	NA
Toluene	1,000	<5.0	<5.0	<5.0	1,000	<5.0	<5.0	<5.0
Xylenes, Total	10,000	<5.0	<5.0	<5.0	10,000	<5.0	<5.0	<5.0

Notes

All concentrations presented in units of ug/L.

Duplicate sample results are presented alongside original sample (e.g., <0.10 / <0.10).

GWPS: Groundwater Protection Standard.

* Constituent not analyzed under routine semi-annual detection monitoring. Listed November 2012 concentration is from MDNR split sample.

RL: Laboratory reporting limit.

NA: Not analyzed.

Constituent detected at or above the laboratory reporting limit.

Constituent exceeds the GWPS.

Table 4-4
Assessment Monitoring Wells
Bridgeton Landfill, LLC – Bridgeton, Missouri

Well	Northing	Easting	Ground Surface Elevation (ft/msl)	Top of Riser Elevation (ft/msl)	Well Diameter (in.)	Casing Material	Screen Material	Screen Length (ft)	Top of Screen Elevation (ft/msl)	Bottom of Screen Elevation (ft/msl)	Purging / Sampling Method
104-SS	1067027.8	516847.3	482.05	484.00	2	Schedule 80 PVC	Schedule 80 PVC	9.80	347.10	337.30	Dedicated Bladder Pump
104-SD	1067013.2	516834.6	481.88	484.15	2	Schedule 80 PVC	Schedule 80 PVC	9.80	246.90	237.10	Dedicated Bladder Pump
104-KS	1066993.0	516820.5	482.24	484.60	2	Schedule 80 PVC	Schedule 80 PVC	9.80	84.93	75.13	Non-Dedicated Waterra Pump
209-SS	1067071.5	517108.6	487.39	489.68	2	Schedule 80 PVC	Schedule 80 PVC	10.0	347.39	337.39	Dedicated Bladder Pump
209-SD	1067075.7	517104.4	487.24	489.58	2	Schedule 80 PVC	Schedule 80 PVC	10.0	247.24	237.24	Dedicated Bladder Pump
210-SS	1066828.4	516777.4	484.53	486.90	2	Schedule 80 PVC	Schedule 80 PVC	10.0	346.53	336.53	Dedicated Bladder Pump
210-SD	1066824.0	516773.1	484.48	487.01	2	Schedule 80 PVC	Schedule 80 PVC	10.0	246.48	236.48	Dedicated Bladder Pump
211-SS	1067060.8	517021.2	485.06	487.41	2	Schedule 80 PVC	Schedule 80 PVC	10.0	348.06	338.06	Dedicated Bladder Pump
211-SD	1067056.7	517016.6	484.83	487.46	2	Schedule 80 PVC	Schedule 80 PVC	10.0	247.83	237.83	Dedicated Bladder Pump

Notes

Location and elevation data from survey performed August 13, 21-22, 29, and 31, 2013.
Proposed locations and elevations for new wells are approximate.

Table 4-5
Recommended Laboratory Analytical Methods
Bridgeton Landfill, LLC – Bridgeton, Missouri

Constituent	Analytical Method
<i>Inorganic Constituents (mg/L)</i>	
Arsenic, Total	SW-846 6020
Barium, Total	SW-846 6010B
Chromium, Total	SW-846 6010B
Cobalt, Total	SW-846 6010B
Nickel, Total	SW-846 6010B
Vanadium, Total	SW-846 6010B
<i>Organic Constituents (ug/L)</i>	
1,2-Dichloroethane	SW-846 8260B
1,2,4-Trimethylbenzene	SW-846 8260B
1,3,5-Trimethylbenzene	SW-846 8260B
1,4-Dichlorobenzene	SW-846 8260B
1-Chlorobutane	SW-846 8260B
4-Methyl-2-Pentanone	SW-846 8260B
Acetone	SW-846 8260B
Benzene	SW-846 8260B
Ethylbenzene	SW-846 8260B
Isopropylbenzene	SW-846 8260B
Methyl Ethyl Ketone	SW-846 8260B
Methyl tert-Butyl Ether	SW-846 8260B
p-Isopropyltoluene	SW-846 8260B
Tetrahydrofuran	SW-846 8260B
Toluene	SW-846 8260B
Xylenes, Total	SW-846 8260B

Figures



LEGEND

 Groundwater Monitoring Well



0 50 100 200 400

Scale in Feet
Graphic Scale: 1 inch = 200 feet



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Bridgeton, Missouri**

**Figure 3-1
Well Location Map**



LEGEND

-  Groundwater Monitoring Well
-  Proposed Groundwater Monitoring Well



0 25 50 100 200

Scale in Feet
Graphic Scale: 1 inch = 100 feet



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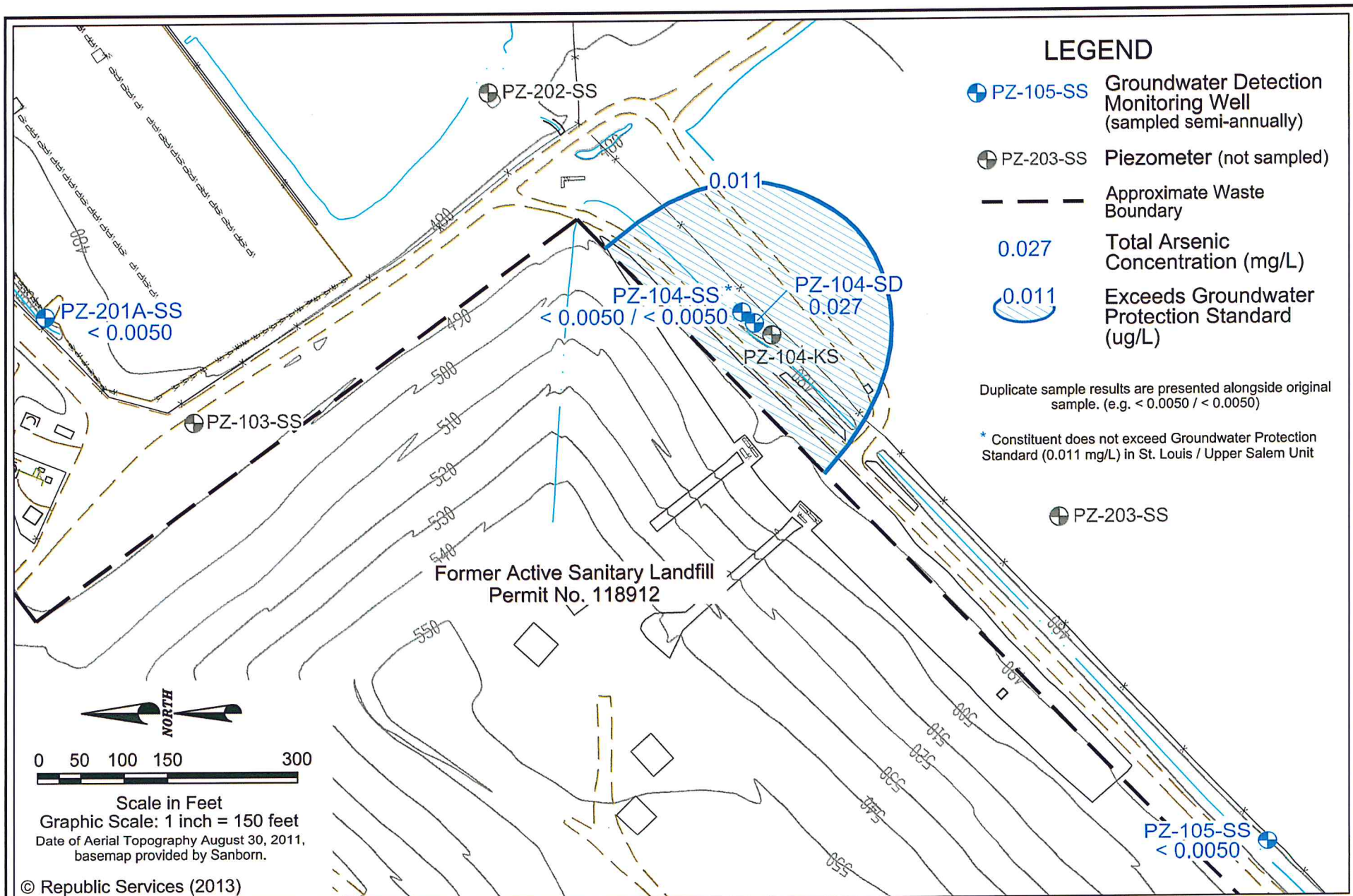
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Bridgeton, Missouri

Figure 4-1
Proposed Assessment
Monitoring Wells

Appendix A

Extent of Assessment Constituents

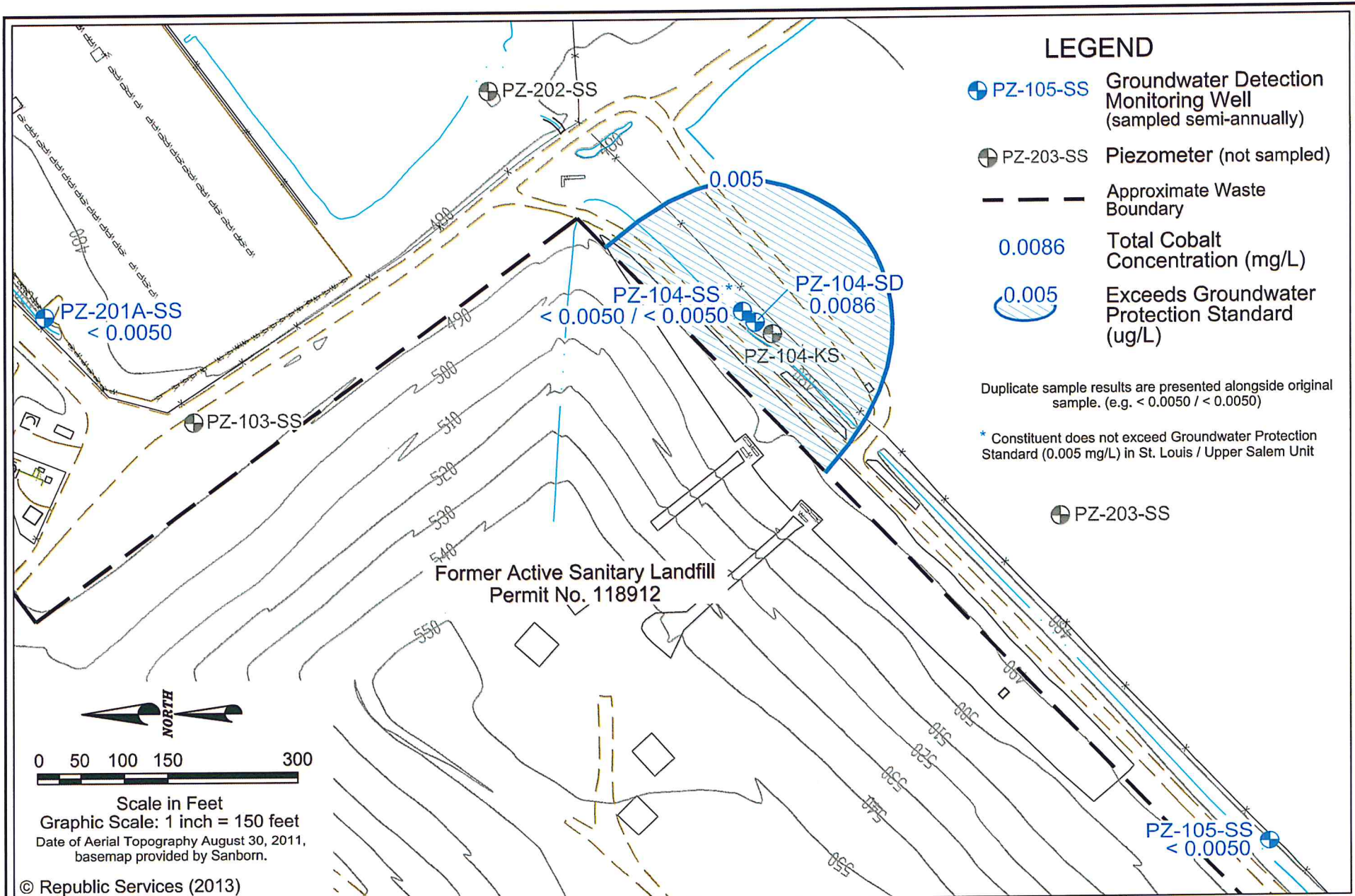


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April 2013 Total Arsenic
Concentrations

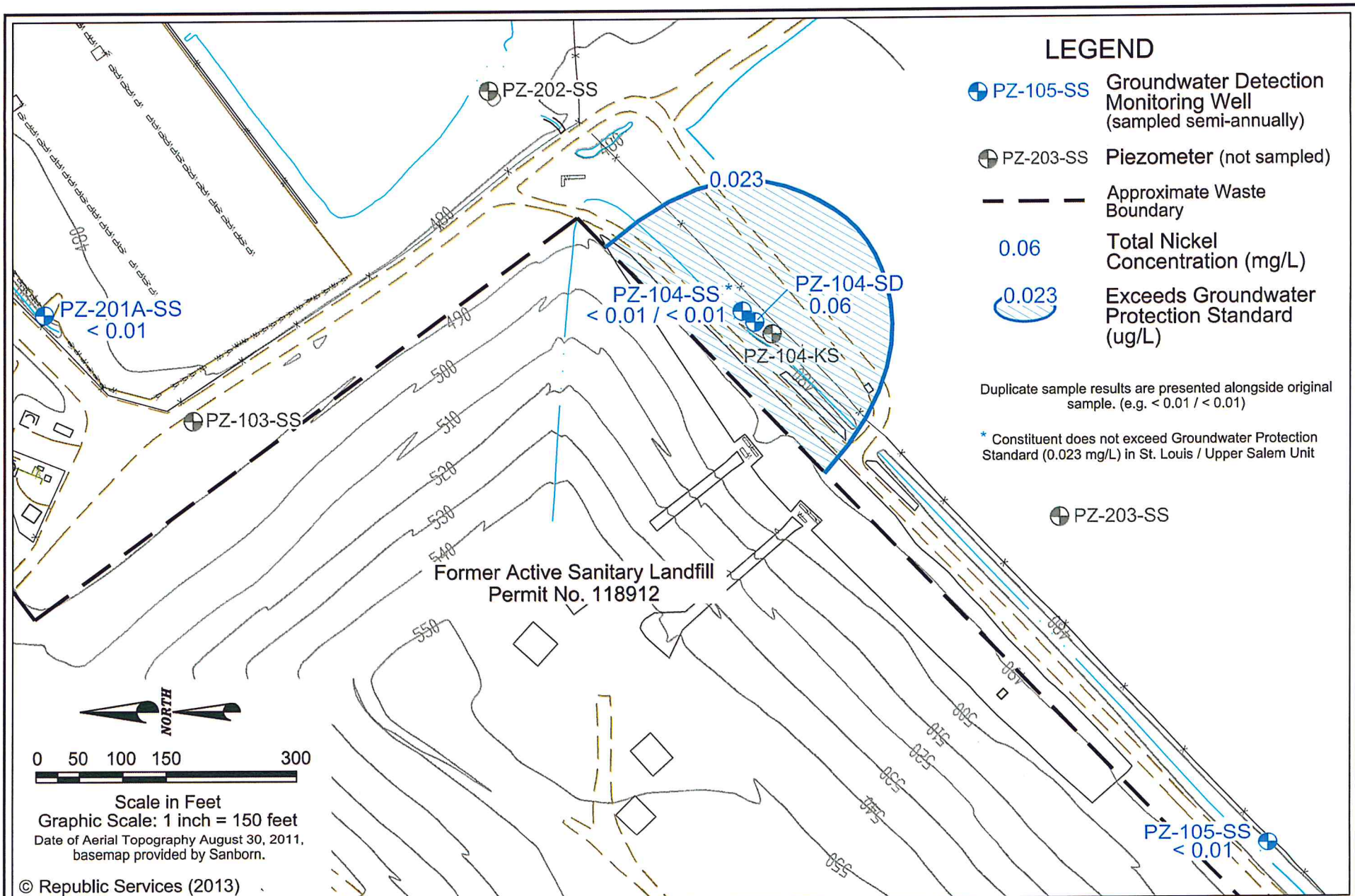


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Total Cobalt Concentrations

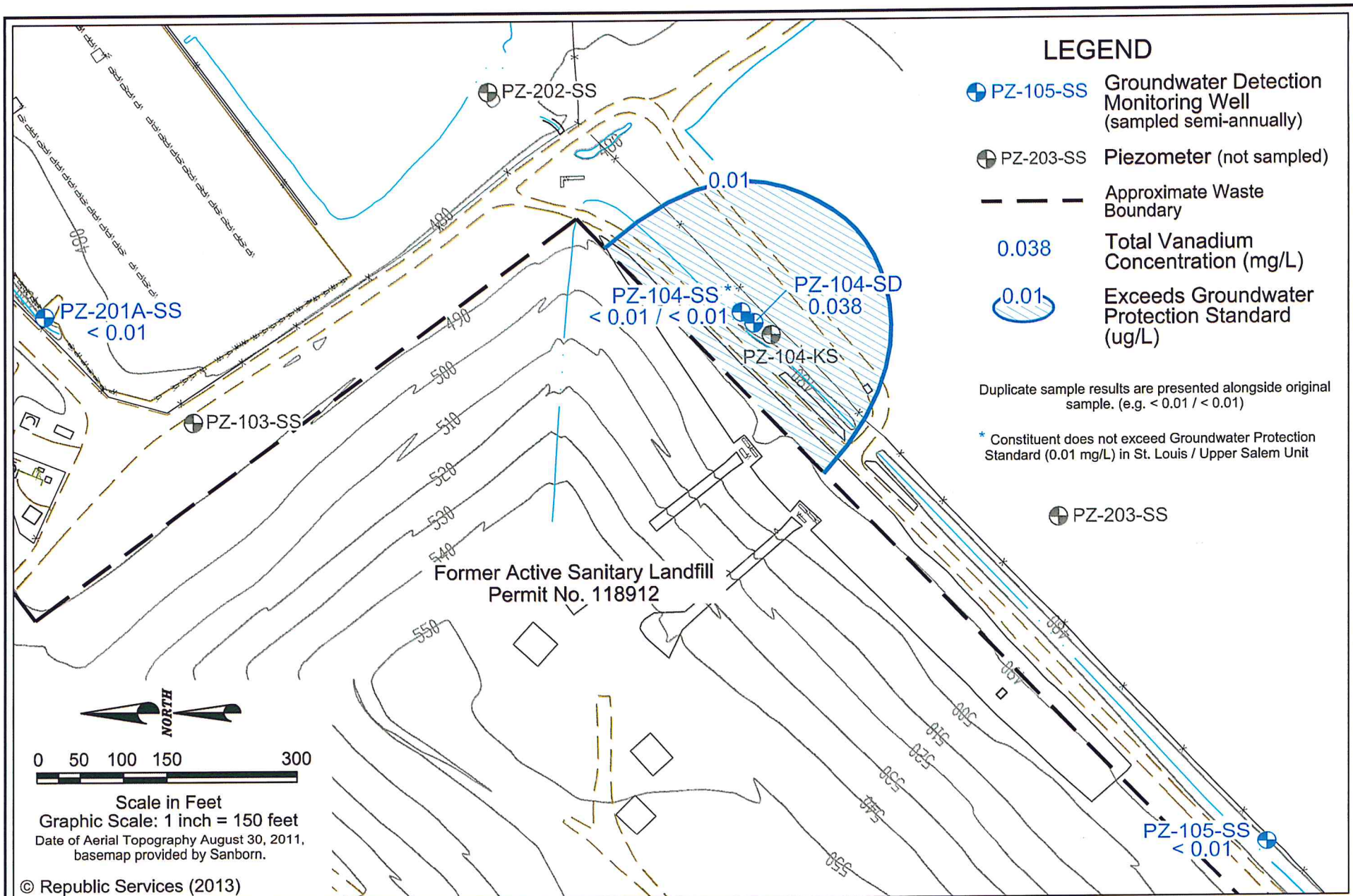


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April 2013 Total Nickel
Concentrations

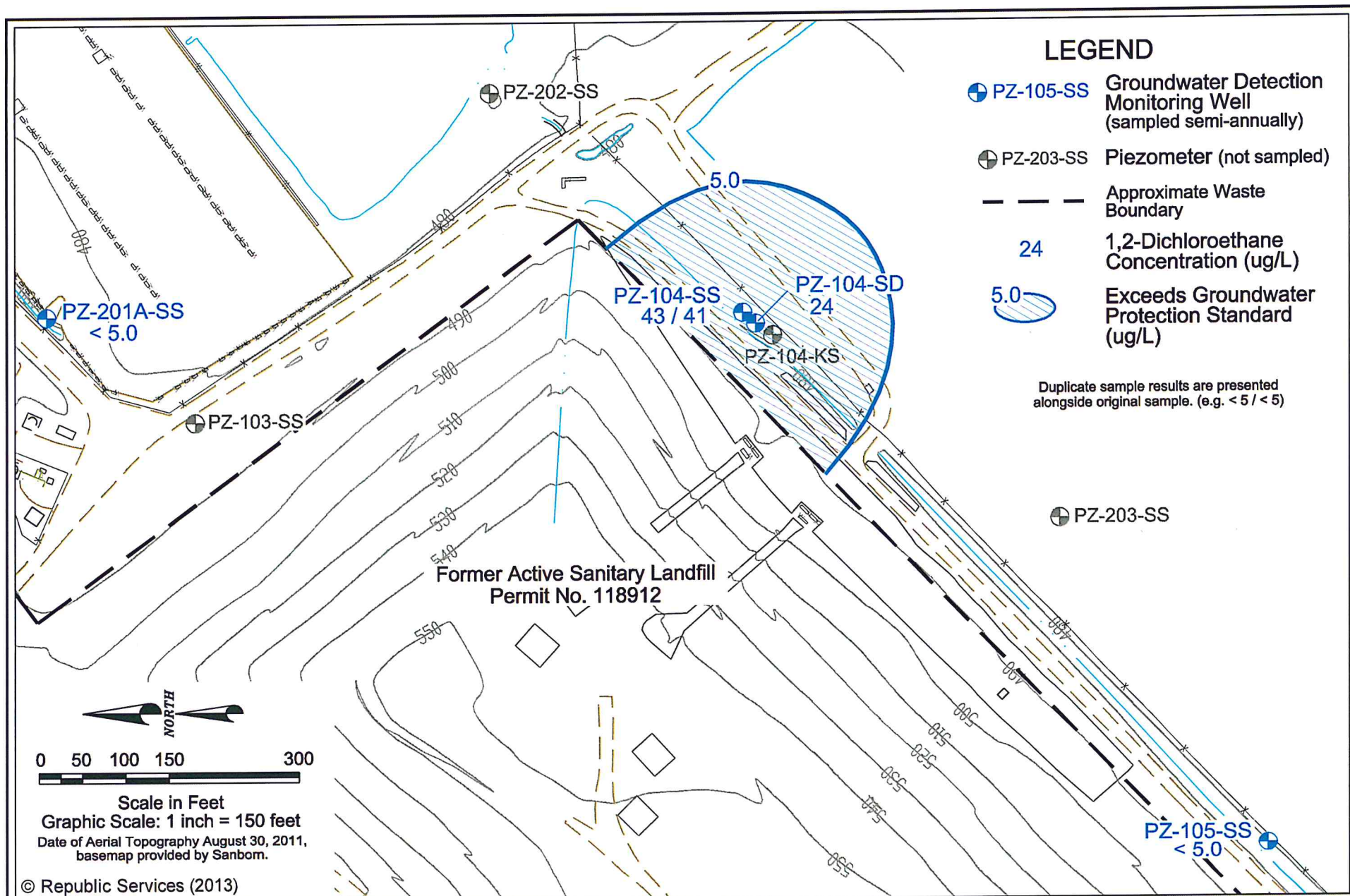


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**April 2013 Total Vanadium
 Concentrations**

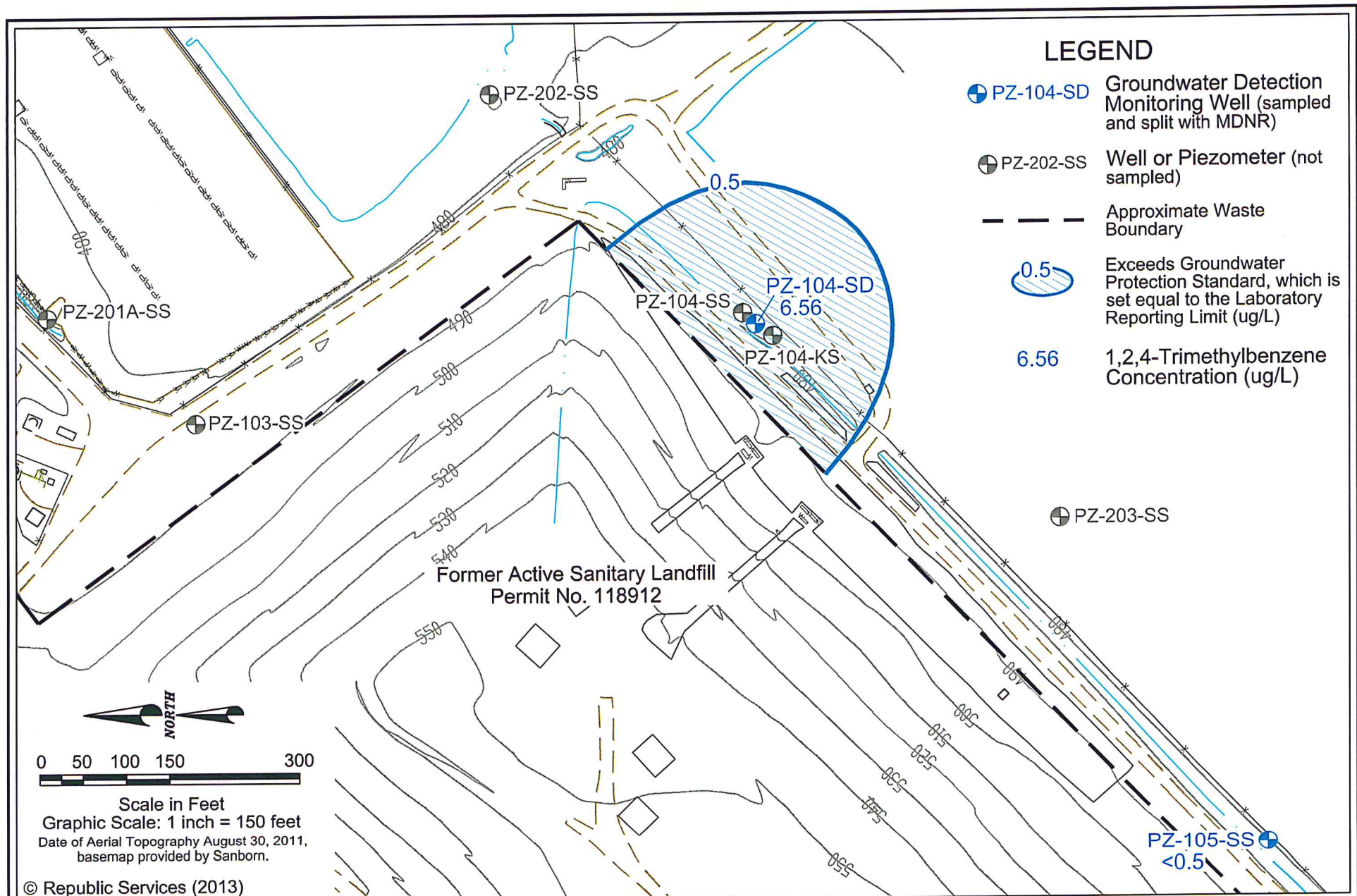


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April 2013 1,2-Dichloroethane
Concentrations

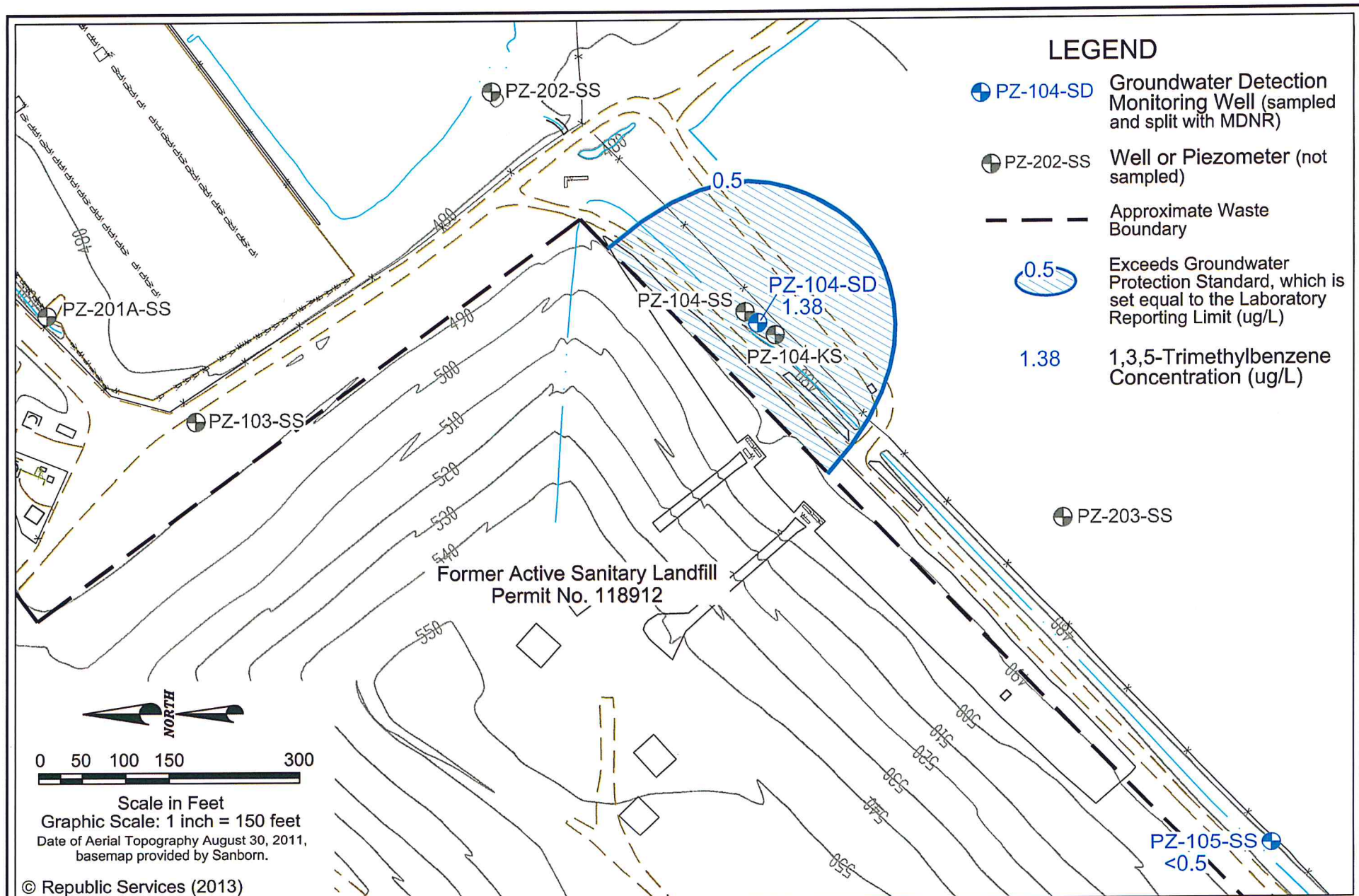


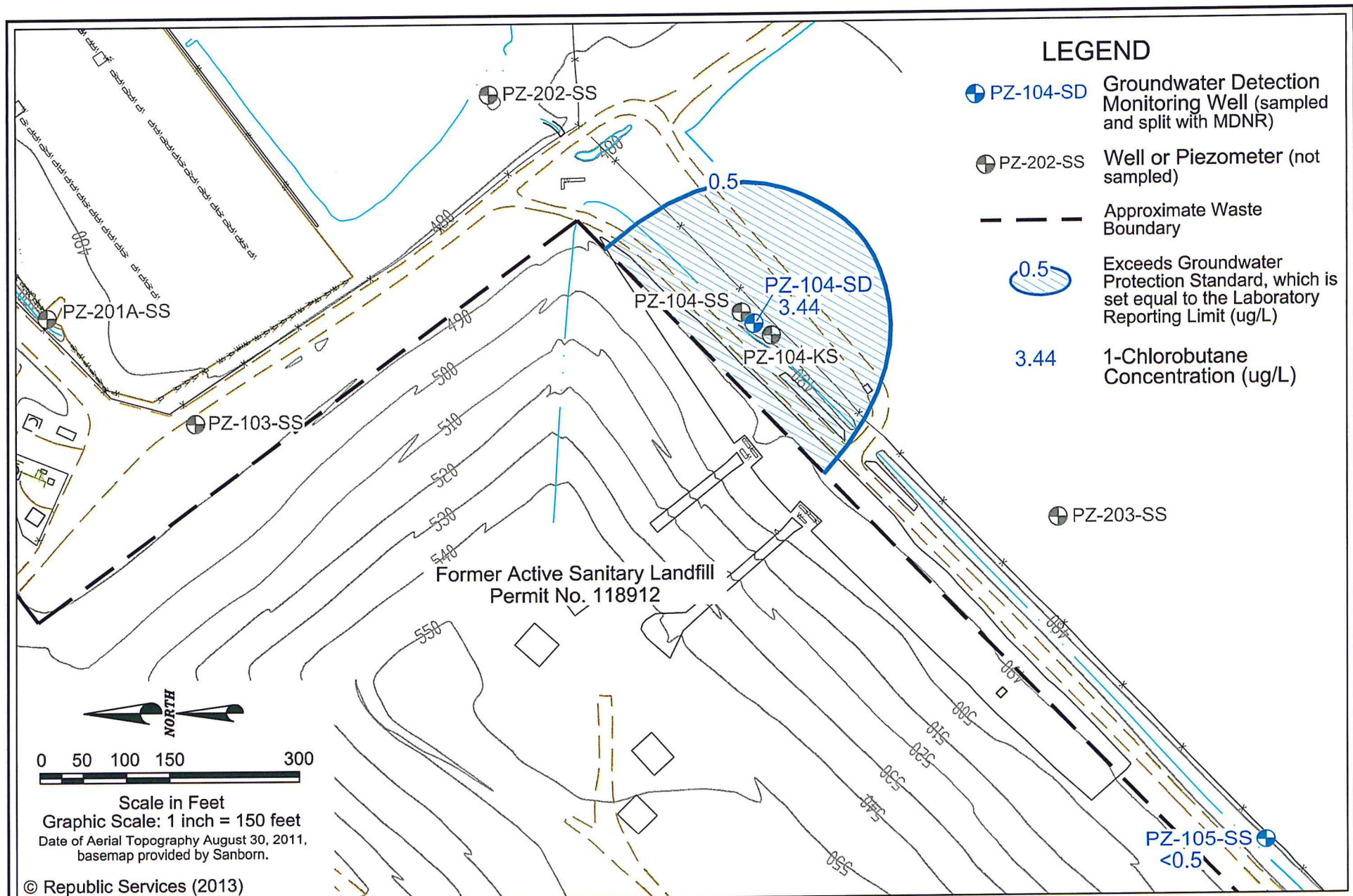
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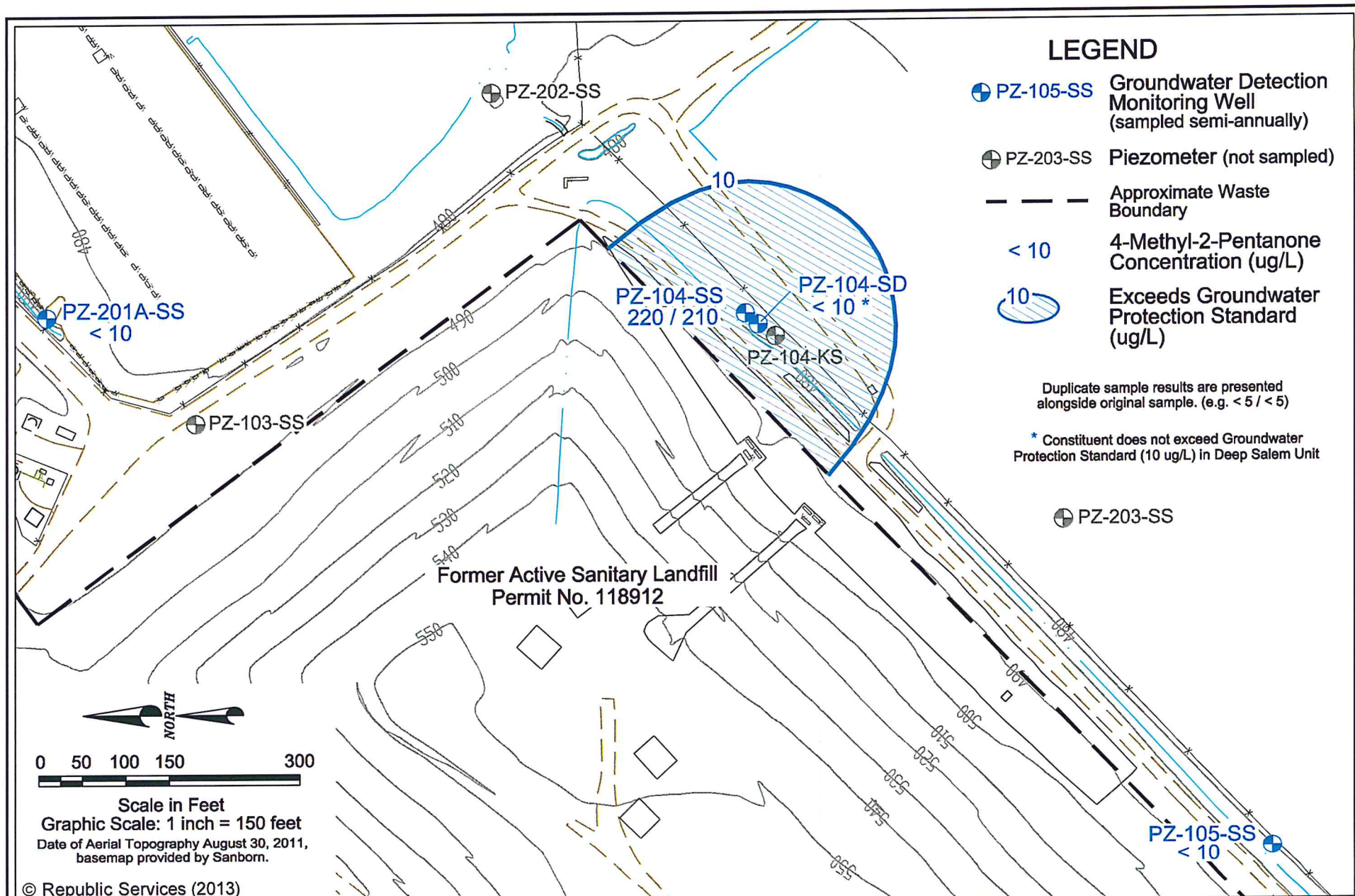
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November 2012
1,2,4-Trimethylbenzene
Concentrations





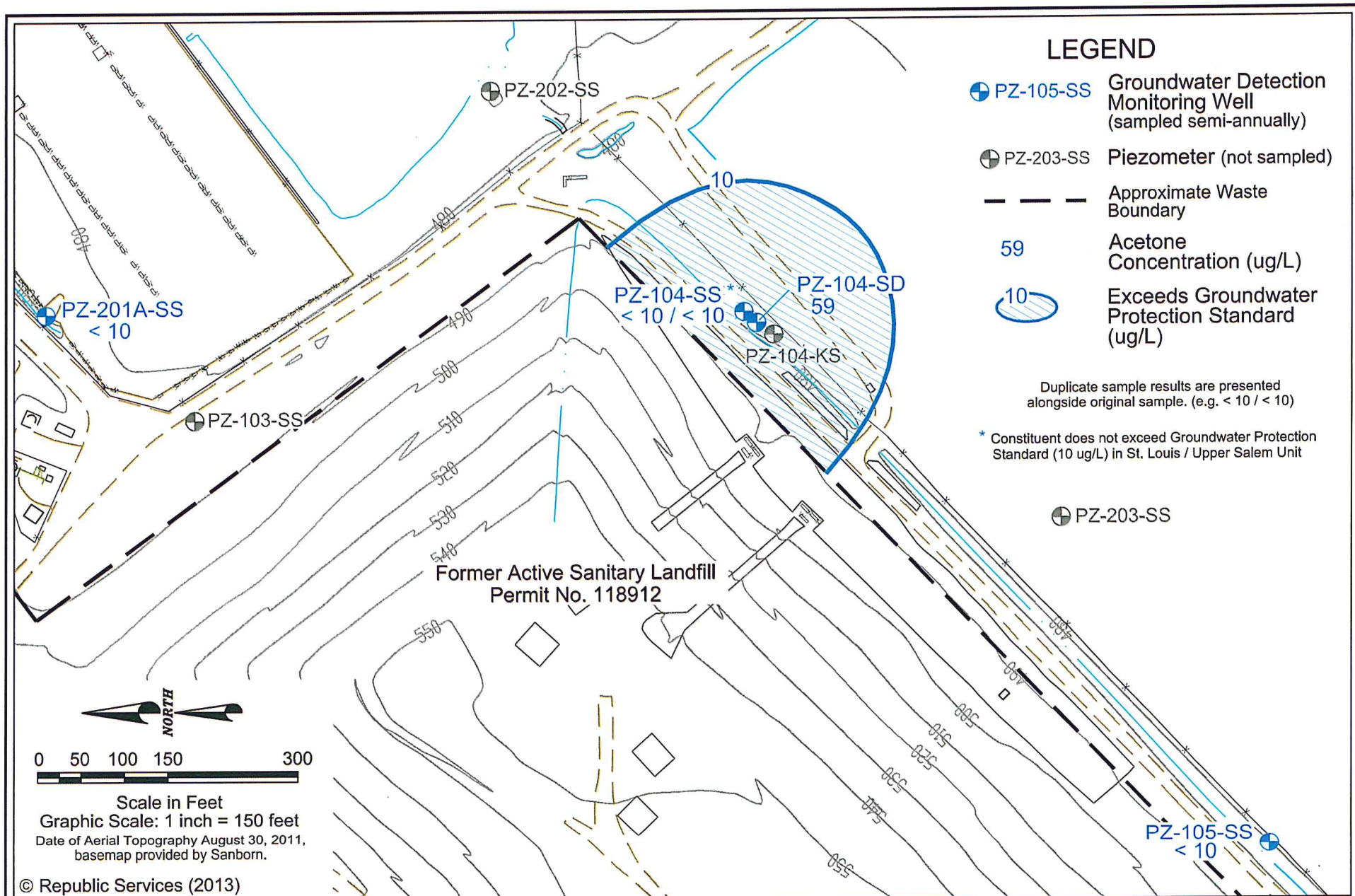


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April 2013 4-Methyl-2-Pentanone
Concentrations

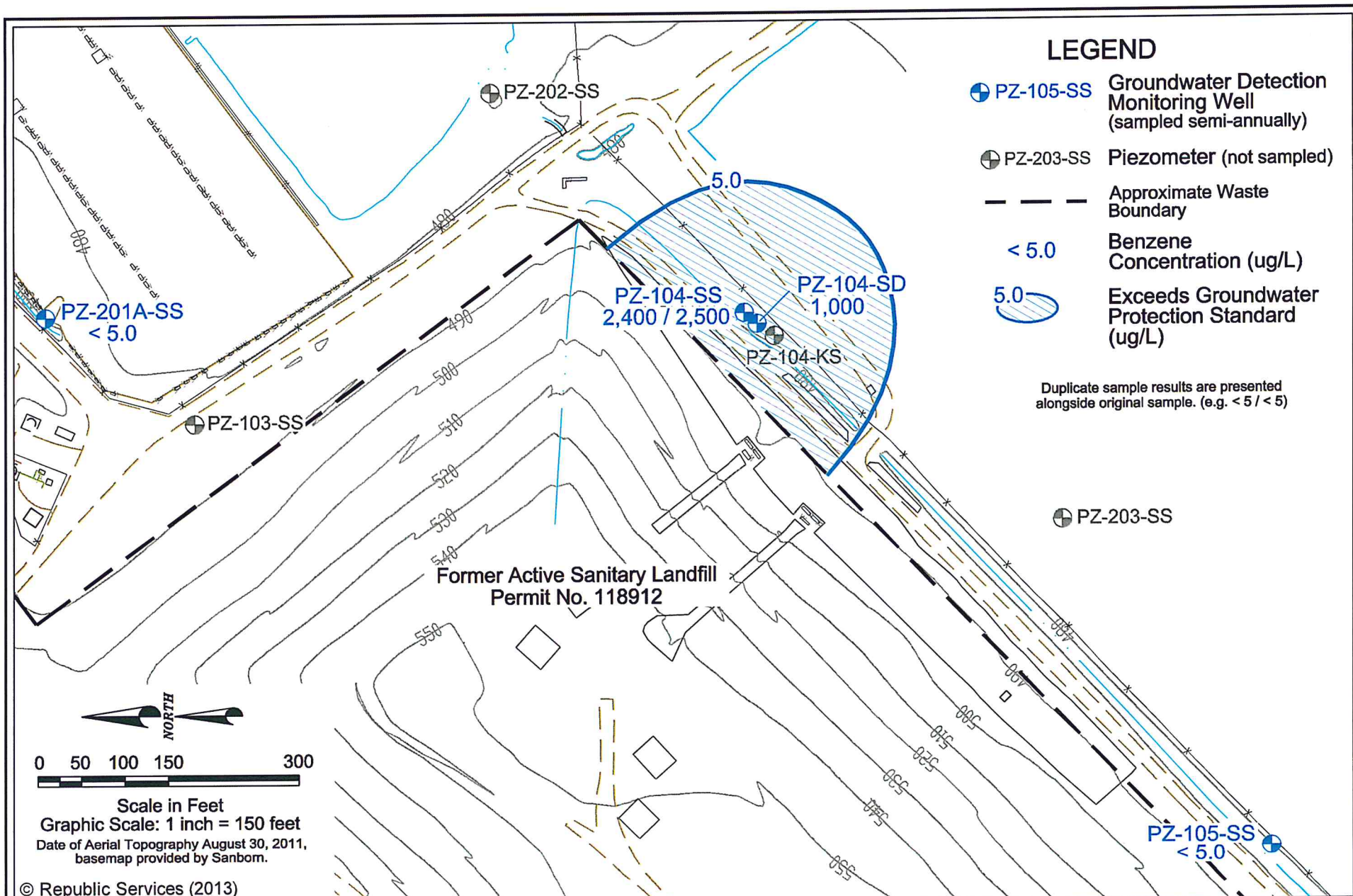


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April 2013 Acetone
Concentrations

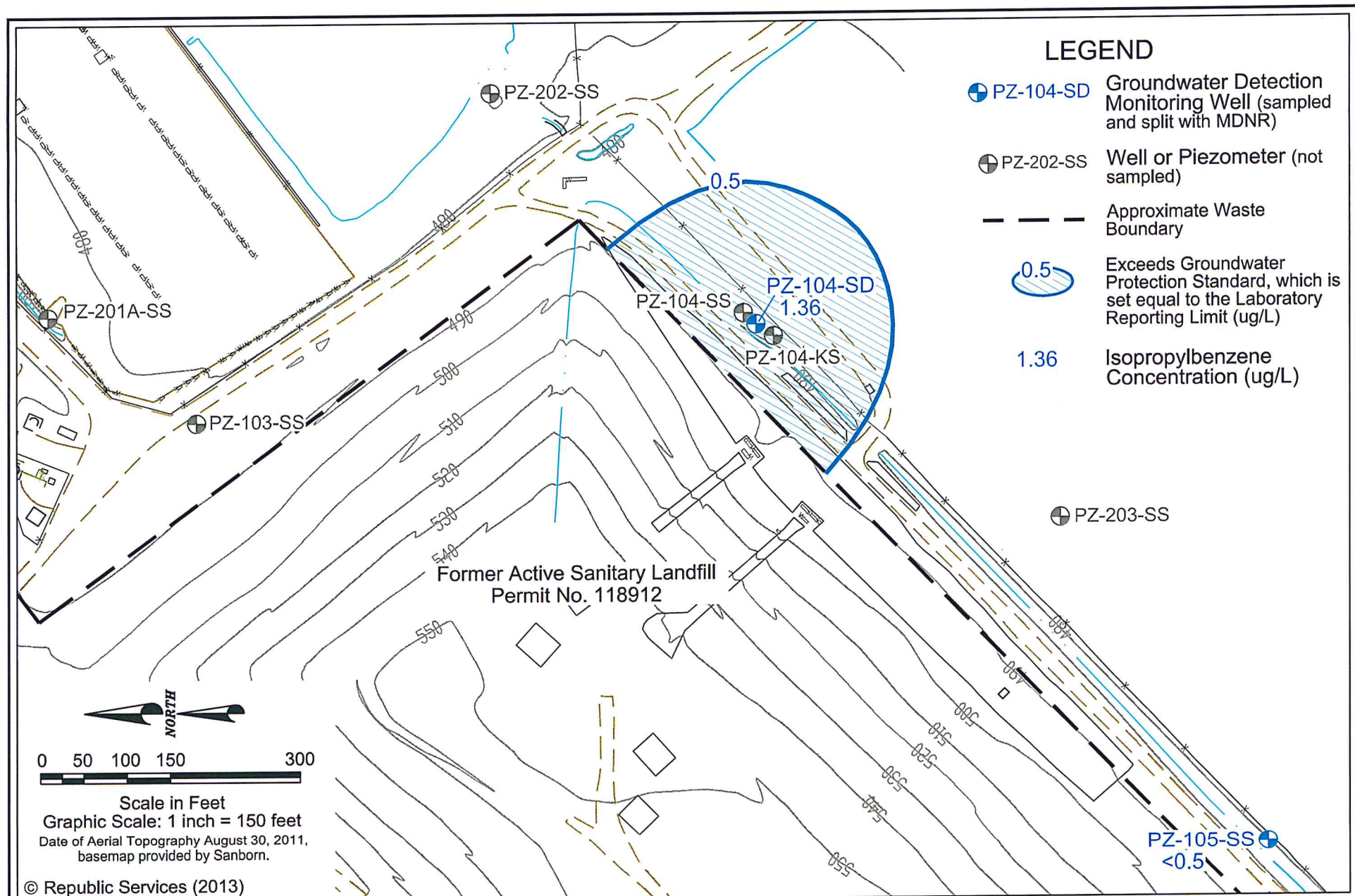


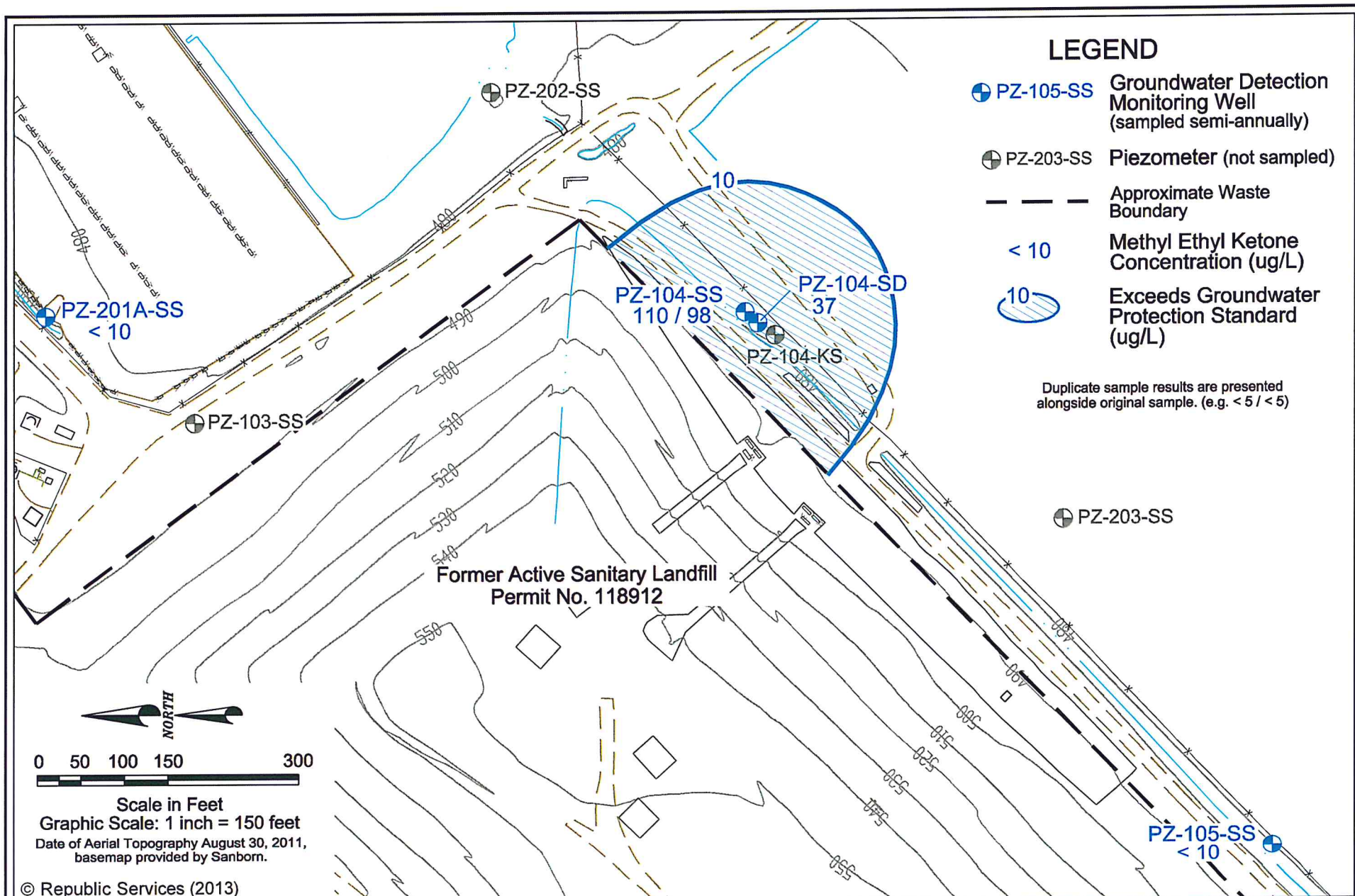
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April 2013
 Benzene Concentrations



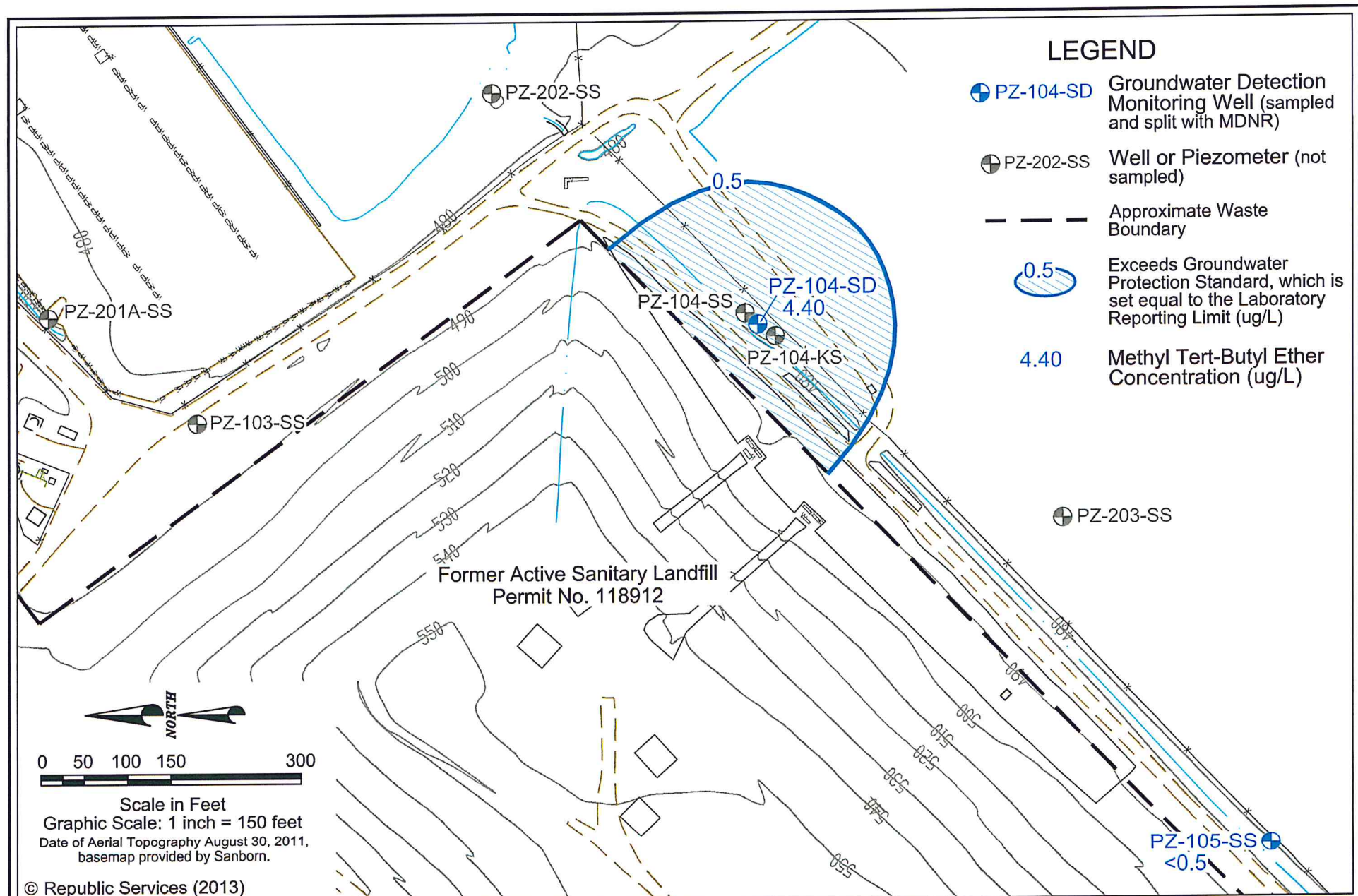


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April 2013 Methyl Ethyl Ketone
Concentrations

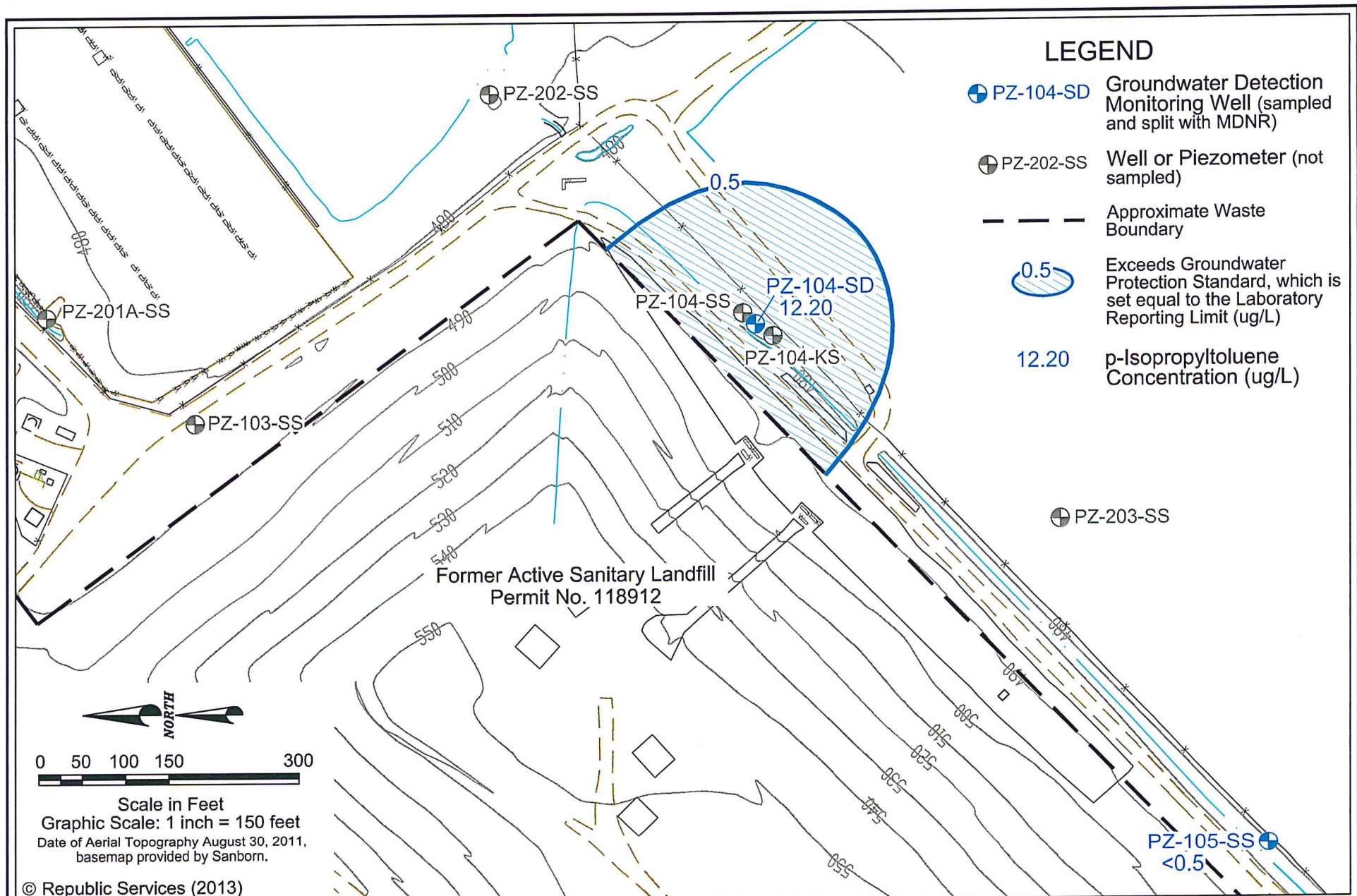


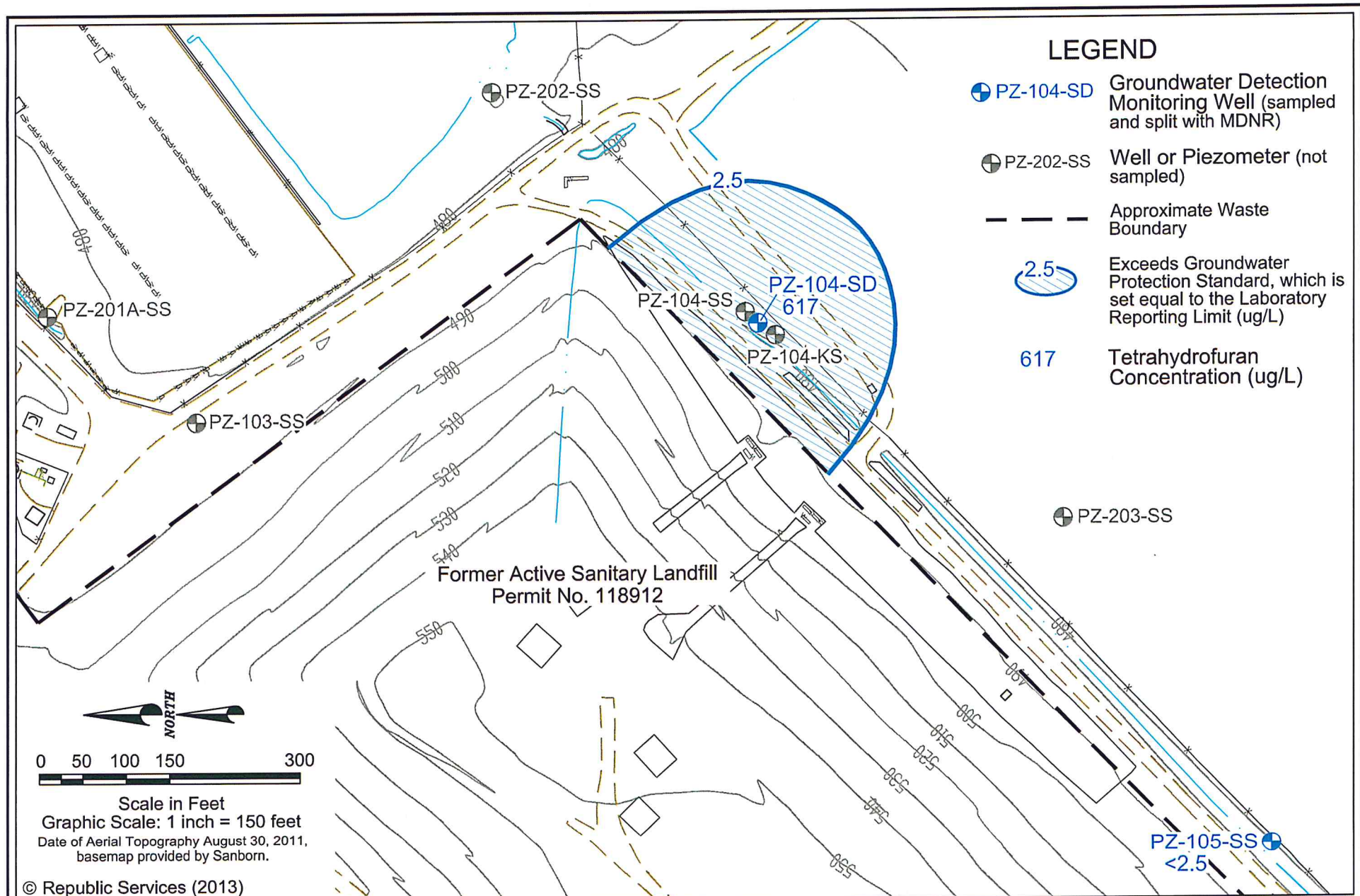
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November 2012
Methyl Tert-Butyl Ether
Concentrations



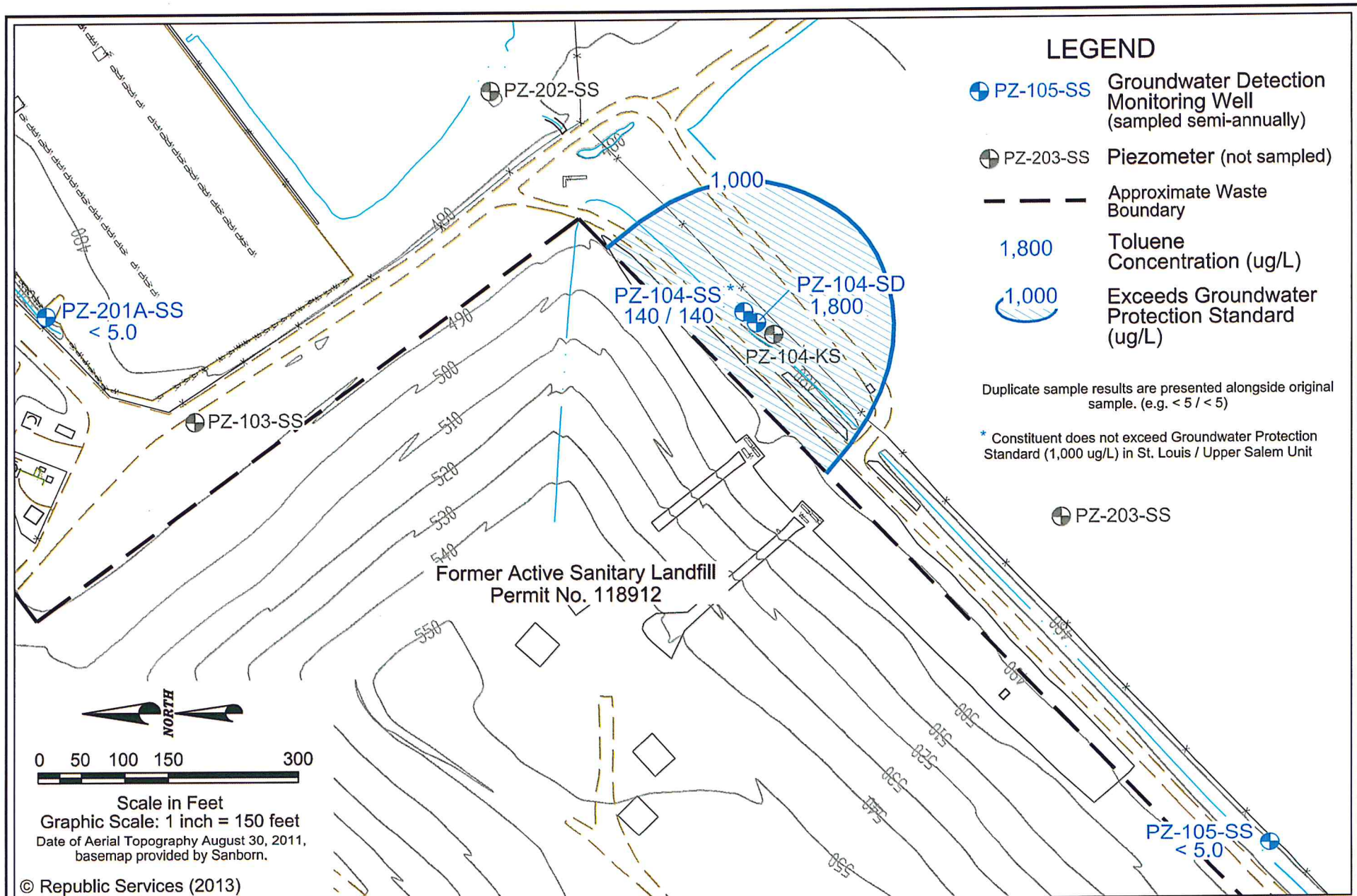


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Bridgeton Landfill, LLC
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November 2012
Tetrahydrofuran
Concentrations



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April 2013
Toluene Concentrations